AMENDMENTS TO THE CLAIMS

In the Claims

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1. (Original) An apparatus for performing acoustic investigation of a subterranean formation having a wellbore therethrough, comprising:

a transmitter configured to transmit acoustic signals;

a receiver configured to receive acoustic signals; and

an acoustic attenuation section disposed between said transmitter and said receiver and comprising one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load.

2. (Original) An apparatus for performing acoustic investigation of a subterranean formation having a wellbore therethrough, comprising:

a transmitter configured to transmit acoustic signals;

a receiver configured to receive acoustic signals; and

an acoustic attenuation section disposed between said transmitter and said receiver and comprising one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load, ~~The apparatus of claim 1~~ wherein said acoustic attenuation section further comprises a plurality of nodal masses disposed along said attenuation section.

3. (Previously Amended) The apparatus of claim 2 wherein said nodal masses aid in attenuation of low frequency signals and resist compression loads on the attenuation section.

4. (Previously Amended) The apparatus of claim 1 wherein said springs are helical springs coated with a layer of resilient material.

5. (Previously Amended) The apparatus of claim 1 wherein said springs have a stiffness of at least 10,000 pounds per inch of deflection.

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6. (Previously Amended) The apparatus of claim 1 wherein said springs have a stiffness of at less than 30,000 pounds per inch of deflection.

7. (Previously Amended) The apparatus of claim 1 wherein the coils of said springs have radial holes extending therethrough.

8. (Previously Amended) The apparatus of claim 1 wherein the outer surface of the spring is separated from the inner surface of the adjoining housing by at least 0.010 inches.

9. (Previously Amended) The apparatus of claim 1 wherein the outer surface of the spring is separated from the inner surface of the adjoining housing by less than 0.100 inches.

10. (Previously Amended) The apparatus of claim 1 wherein the outer surface of the housing is covered with an attenuating material.

11. (Previously Amended) The apparatus of claim 1 further comprising one or more rod members adapted to interconnect between two springs.

12. (Previously Amended) An apparatus for performing acoustic investigation of a subterranean formation having a wellbore therethrough, comprising:

a transmitter configured to transmit acoustic signals;

a receiver configured to receive acoustic signals;

an acoustic attenuation section disposed between said transmitter and said receiver and comprising one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load, and wherein said acoustic attenuation section further comprises a plurality of nodal masses disposed along said attenuation section; and

one or more rod members adapted to interconnect between two springs, ~~The apparatus of claim 11~~ wherein said nodal masses are disposed about said rod members.

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13. (Previously Amended) The apparatus of claim 12 further including a layer of resilient material disposed between said rod member and said nodal mass.

14. (Original) The apparatus of claim 1 wherein said attenuation section is capable of axial loads of 100,000 pounds.

15. (Original) The apparatus of claim 1 wherein said attenuation section is filled with fluid.

16. (Original) An apparatus for attenuation of an acoustic signal comprising;

a plurality of springs connected in series to form an elongated body; and

a plurality of housings corresponding in number to and disposed about said springs;

wherein said housing limits the axial deflection of said springs.

17. (Original) An apparatus for attenuation of an acoustic signal comprising;

a plurality of springs connected in series to form an elongated body;

a plurality of housings corresponding in number to and disposed about said springs;

wherein said housing limits the axial deflection of said springs; and ~~The apparatus of claim 16 further comprising~~

a plurality of nodal masses corresponding in number to said springs and disposed along the length of the body.

18. (Original) The apparatus of claim 16 further comprising a plurality of rod members axially interconnected between two springs.

19. (Original) The apparatus of claim 16 further comprising a plurality of masses and a plurality of rod members, wherein said rod members are axially disposed between and connected to adjacent springs and said masses are positioned about said rod members.

20. (Original) The apparatus of claim 16 wherein said mass is separated from said rod members by a layer of attenuating material.

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21. (Original) The apparatus of claim 16 wherein said springs are coated with a layer of resilient material.

22. (Original) The apparatus of claim 16 wherein said springs are helical springs with a minimum stiffness of 10,000 lbs/in.

23. (Original) The apparatus of claim 16 wherein a circumferential gap of between 0.010 and 0.100 inches is maintained between the outside surface of said spring and the inside surface of said housing.

24. (Original) The apparatus of claim 16 wherein the outside surface of said housings are coated with an attenuating material.

25. (Original) A method for attenuating acoustic energy transmitted along an acoustic tool, wherein the acoustic tool comprises a transmitter section, a receiver section, and an attenuation section disposed between the transmitter and receiver sections, comprising:

transmitting acoustic energy from the transmitter section into the attenuation section;

transmitting acoustic energy through the attenuation section to produce an attenuated acoustic energy, wherein the attenuation section comprises a one or more springs connected in series, a corresponding number of housings disposed about the springs, and a corresponding number of nodal masses; and

receiving the attenuated acoustic energy at the receiver.

26. (Original) A method for transmitting acoustic energy along an acoustic tool, wherein the acoustic tool comprises a transmitter section, a receiver section, and an attenuation section disposed between the transmitter and receiver sections, comprising:

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receiving acoustic energy from the transmitter with a first spring, wherein the first spring is enclosed within a housing that prevents extension of the spring beyond a predetermined limit;

receiving acoustic energy from the first spring with a connecting rod; wherein the connecting rod possesses a nodal mass that prevents compression of the spring beyond a predetermined limit;

receiving acoustic energy from the connecting rod with a second spring; and

receiving acoustic energy with the receiver via the second spring, wherein the acoustic energy received via the second spring is attenuated relative to the acoustic energy received by the first spring for all frequencies greater than 500 Hz.